CLAIMS

What is claimed is:

1. A method of operating a chemical oxygen-iodine laser, comprising:

coupling the chemical oxygen-iodine laser system to a source of potassium hydroxide, a source of molecular chlorine gas, a source of hydrogen peroxide, a source of molecular iodine gas, and a source of molecular nitrogen gas;

reacting at least one of potassium hydroxide, a molecular chlorine gas, a hydrogen peroxide, a molecular iodine gas, and a molecular nitrogen gas;

producing at least one of spent water, spent aqueous basic hydrogen peroxide, and spent laser exhaust gas that includes molecular oxygen, molecular nitrogen, molecular chlorine, molecular iodine, and molecular water

collecting an amount of the spent basic hydrogen peroxide including of an amount of spent aqueous potassium chloride;

collecting an amount of the spent laser exhaust gas;

processing the spent laser exhaust gas to separate the spent molecular oxygen gas from the spent molecular nitrogen gas;

processing the amount of spent aqueous potassium to convert the amount of spent aqueous potassium chloride and the spent aqueous potassium iodide into a substance selected from the group consisting of molecular hydrogen, molecular chlorine, aqueous potassium hydroxide, and combinations thereof;

combining the molecular oxygen gas with a substance selected from the group consisting of the spent water, the molecular, or combinations thereof to form hydrogen peroxide; and

mixing the hydrogen peroxide from with the aqueous potassium hydroxide to form basic hydrogen peroxide.

2. The method according to claim 1, further comprising:

processing the molecular chlorine and the molecular iodine to separate the molecular chlorine from the molecular iodine.

3. The method according to claim 2, further comprising:

returning the molecular chlorine to the molecular chlorine gas source.

4. The method according to claim 2, further comprising:

returning the molecular iodine to the molecular iodine gas source.

5. The method according to claim 1, further comprising::

introducing the basic hydrogen peroxide to the basic hydrogen peroxide source.

6. The method according to claim 1, wherein processing the spent laser exhaust gas includes processing the spent laser exhaust gas with at least one of a pressure swing adsorption system, a membrane separator system, and combinations thereof.

7. The method according to claim 1, wherein processing the amount of spent aqueous potassium comprises an applying an electrical current to the amount of spent aqueous potassium.

8. The method according to claim 1, wherein combining the molecular oxygen gas includes generating an electrical current to assist in the combination.

9. The method according to claim 1, further comprising:

generating power from a light source.

10. The method according to claim 1, wherein collecting an amount of the spent laser exhaust gas includes:

condensing the spent molecular chlorine, molecular iodine, and molecular water contained in the spent laser exhaust gas; and

sorbing the spent molecular oxygen and molecular nitrogen contained in the spent laser exhaust gas.

5

11. A method for operating a chemical oxygen-iodine laser system coupled to a source of potassium hydroxide, molecular chlorine gas, hydrogen peroxide, molecular iodine gas, and molecular nitrogen gas, wherein the system produces spent water, spent aqueous basic hydrogen peroxide, and spent laser exhaust gas comprising molecular oxygen, molecular nitrogen, molecular chlorine, molecular iodine, and molecular water, comprising:

collecting an amount of spent basic hydrogen peroxide comprised of spent aqueous potassium chloride;

collecting an amount of the spent laser exhaust gas;

separating the spent aqueous potassium chloride into a first stream comprising water and a second stream comprising aqueous potassium chloride;

separating the molecular oxygen and the molecular nitrogen from the molecular chlorine and the molecular iodine in the spent laser exhaust gas;

converting the spent aqueous potassium chloride into a substance selected from the group consisting of molecular hydrogen, molecular chlorine, aqueous potassium hydroxide, and combinations thereof;

separating the molecular oxygen from the molecular nitrogen;

combining the molecular with a substance selected from the group consisting of the spent water, the molecular, or combinations thereof to form hydrogen peroxide; and

mixing the hydrogen peroxide with the aqueous potassium hydroxide to form basic hydrogen peroxide.

12. The method according to claim 11, further comprising:
separating the molecular chlorine from the molecular iodine.

13. The method according to claim 11, further comprising:
returning the molecular chlorine to the molecular chlorine gas source; and
returning the molecular iodine to the molecular iodine gas source.

14. The method according to claim 11, further comprising:
introducing the basic hydrogen peroxide into the basic hydrogen peroxide source.

15. The method according to claim 11, wherein separating the molecular oxygen from the molecular nitrogen includes separating the molecular oxygen from the molecular nitrogen with at least one of a pressure swing adsorption system, a membrane separator system, and combinations thereof.

16. The invention according to claim 11, wherein converting the spent aqueous potassium chloride third processing system includes providing an electrical current to assist in wherein converting the spent aqueous potassium chloride.

17. The method according to claim 11, further comprising:
generating an electrical current.

18. The method according to claim 11, further comprising:
producing electrical power with a light source.

19. The method according to claim 11, wherein collecting an amount of the spent laser exhaust gas includes:

condensing the spent molecular chlorine, molecular iodine, and molecular water contained in the spent laser exhaust gas; and

sorbing the spent molecular oxygen and molecular nitrogen contained in the spent laser exhaust gas.

20. A method of operating a chemical oxygen-iodine laser system, coupled to a potassium hydroxide source, molecular chlorine gas source, hydrogen peroxide source, molecular iodine gas source, and molecular nitrogen gas source, wherein the system produces spent water, spent aqueous basic hydrogen peroxide, and spent laser exhaust gas including molecular oxygen, molecular nitrogen, molecular chlorine, molecular iodine, and molecular water, the method comprising:

collecting an amount of spent basic hydrogen peroxide including aqueous potassium chloride;

collecting an amount of the spent laser exhaust gas;

separating the spent aqueous potassium chloride into a first stream comprising water and a second stream comprising aqueous potassium chloride;

separating the spent laser exhaust gas the molecular oxygen and the molecular nitrogen from the molecular chlorine and the molecular iodine,

separating the molecular chlorine from the molecular iodine;

converting the spent aqueous potassium chloride into a substance selected from the group consisting of molecular hydrogen, molecular chlorine, aqueous potassium hydroxide, and combinations thereof;

separating the molecular oxygen from the molecular nitrogen;

forming hydrogen peroxide by combining the molecular oxygen with a substance selected from the group consisting of the spent water, the molecular, or combinations thereof;

mixing the hydrogen peroxide with the aqueous potassium hydroxide to form basic hydrogen peroxide;

returning the molecular chlorine to the molecular chlorine gas source;

returning the molecular iodine to the molecular iodine gas source; and

introducing the formed basic hydrogen into the basic hydrogen peroxide source.